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From Digital Resources to Competitive Positioning: Evidence from MSMEs in East Bandung

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Abstract

Purpose: This study investigates the micro-level process through which system features are transformed into digital resources and activated through sensing, seizing, and reconfiguring capabilities to generate emerging competitive positioning in Indonesian MSMEs.

Research Methodology: A multiple-case embedded design involving six Indonesian Micro, Small, Medium Enterprises (MSMEs) was employed. Data were collected over six weeks through semi-structured interviews with twelve informants, participatory observation, and system log analysis. Data analysis followed within-case analysis, cross-case pattern matching, and analytical generalization stages.

Results: Routine embedding and managerial decision commitment are decisive in determining whether digital artifacts acquire strategic value. Data utilization intensity stimulates sensing capability; however, without managerial commitment, sensing does not evolve into seizing. Cases with high activation show improved customer retention, faster market response, and fewer operational errors, while low-activation cases remain at basic administrative use.

Conclusions: Digital transformation in MSMEs is a staged process where competitive advantage emerges when resources, capabilities, and managerial practices align. Technology investment alone is insufficient without behavioral adoption and managerial commitment.

Limitations: The study is limited to six MSMEs in a single regional ecosystem, restricting statistical generalization. The observation period captures early-stage activation effects rather than sustained competitive advantage.

Contributions: This study proposes a staged resource activation mechanism integrating Resource Based View (RBV) digital resource scholarship and dynamic capability theory within digitally emerging MSME contexts, offering theoretical refinement and practical guidance for policymakers and Small and Medium Enterprise (SME) leaders in developing economies

Keywords: *Competitive Positioning, Managerial Decision Commitment, Reconfiguring Capability, Resource Activation Process, Routine Embedding*

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1. Introduction

Digital transformation has fundamentally reshaped the competitive landscape across industries and redefined competitive logics through platform-based ecosystems and digitally enabled innovation processes ([Nambisan, Wright, & Feldman, 2019](#); [Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, & Haenlein, 2021](#)). In emerging economies, micro, small, and medium enterprises play a critical role in employment generation and economic resilience, yet they often face structural constraints that limit their ability to extract strategic value from digital initiatives. Although government programs actively encourage digitalization, Micro, Small and Medium Enterprises (MSMEs) frequently interpret digital transformation as mere system adoption rather than capability development ([Hanelt, Bohnsack, Marz, & Antunes, 2021](#); [Kraus, Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022](#); [Plekhanov, Franke, & Netland, 2023](#))

Recent scholarship by [Vial \(2021\)](#) emphasizes that digital transformation should be understood as a multidimensional organizational change encompassing strategy, structure, culture, and capabilities rather than simply technological integration ([Hanelt et al., 2021](#); [Verhoef et al., 2021](#); [Warner, & Wäger, 2019](#)). Empirical research further demonstrates that digital technologies alone do not guarantee performance improvement. Instead, competitive advantage emerges when digital technologies are orchestrated through firm-specific capabilities and organizational readiness ([Jun, Nasir, Yousaf, Khattak, Yasir, Javed, & Shirazi, 2022](#)). And through firm-specific dynamic capabilities that enable sensing, seizing, and reconfiguring digital opportunities ([Miguel, De-Pablos-Herederó, Montes, & García, 2022](#); [Warner and Wäger, 2019](#)). From an ecosystem perspective, digital transformation further enables platform-mediated value co-creation among firms, customers, and partners ([Nambisan et al., 2019](#)).

Despite this theoretical advancement, two critical gaps remain. First, much of the literature relies on large-sample quantitative studies that measure digital maturity and performance correlations without explaining how digital artifacts become strategic resources at the micro-organizational level ([Kraus et al., 2022](#)). Second, empirical studies that unpack the processual mechanism linking digital adoption to competitive positioning in Micro, Small, and Medium Enterprises (MSMEs) within developing economies remain scarce ([Anatan, & Nur, 2023](#); [Kurniawati, Idris, Handayati, & Osman, 2021](#); [Purnomo, Nurmalitasari, & Nurchim, 2024](#)).

Within the Indonesian context, MSMEs account for the majority of business entities and contribute significantly to GDP. However, digital adoption often remains superficial, focusing on website deployment or marketplace registration without internal process transformation. Consequently, the expected performance gains frequently do not materialize. This paradox suggests that digital transformation requires deeper organizational activation mechanisms ([Kurniawati et al., 2021](#)).

Drawing upon modern Resources Based View (RBV)-informed work on digital resources and recent dynamic capability frameworks, competitive advantage in digital contexts arises from digital resources embedded in routines and converted into activated capabilities capable of sensing, seizing, and reconfiguring opportunities ([Miguel et al., 2022](#); [Plekhanov et al., 2023](#)). This study seeks to integrate these perspectives by examining how system features are converted into digital resources through routine embedding, how data utilization intensity stimulates sensing capability, how managerial decision commitment determines the transition from sensing to seizing, how organizational adjustment influences reconfiguring effectiveness, and how these mechanisms collectively generate emerging competitive positioning in local MSMEs.

By employing a multiple-case embedded study, this research contributes to theory by explicating a staged activation mechanism linking digital artifacts to competitive positioning. It contributes to practice by offering actionable insights for MSME leaders and policymakers regarding capability-based digital transformation.

2. Literature Review

Digital transformation has evolved from an IT-centric concept to a strategic renewal paradigm ([Hanelt, Bohnsack, Marz, & Antunes, 2021](#); [Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, & Haenlein, 2021](#)). Recent reviews highlight that digital transformation outcomes depend not only on technology deployment but also on managerial capabilities, digital platforms, and organizational readiness ([Kraus, Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022](#); [Plekhanov, Franke, & Netland, 2023](#); [Warner, & Wäger, 2019](#)).

In digital environments, resources such as customer databases, analytics systems, and transaction logs acquire strategic significance only when embedded into routines and used in decision-making processes ([Vial, 2021](#)). Contemporary RBV-oriented studies have reconceptualized 'resources' to include digital artifacts whose strategic value is determined by activation pathways inside the firm ([Jun, Nasir, Yousaf, Khattak, Yasir, Javed, & Shirazi, 2022](#); [Piccoli, Grover, & Rodriguez, 2024](#)). From a theoretical perspective, the Resource-Based View (RBV) explains this phenomenon by emphasizing that competitive advantage arises from valuable and difficult-to-imitate resources, while assuming that such resources generate value when properly embedded within organizational routines.

Dynamic Capability theory provides a complementary process lens by focusing on a firm's ability to sense opportunities, seize them through strategic commitments, and reconfigure organizational assets to sustain competitiveness ([Miguel, De-Pablos-Herederó, Montes, & García, 2022](#); [Plekhanov et al., 2023](#); [Warner and Wäger, 2019](#)). Recent empirical work operationalizes sensing, seizing, and reconfiguring in SME contexts and links these micro-level processes to digital adoption outcomes ([Miguel et al., 2022](#)). In contrast to RBV relatively static focus on resource possession, Dynamic Capability Theory explains how firms continuously transform and renew these resources through iterative processes of sensing, seizing, and reconfiguring in response to environmental change.

Within Small and Medium Enterprises (SMEs), capability activation is influenced by leadership commitment, organizational readiness, and external ecosystem support ([Blichfeldt, & Faullant, 2021](#); [Jun et al., 2022](#); [Kraus et al., 2022](#)). Several recent studies in emerging economy contexts emphasize that routine embedding, managerial decision-making, and low-cost analytics adoption are decisive for transforming digital artifacts into strategic resources ([Egala, Amoah, Opoku, & Bruce, 2024](#); [Kurniawati, Idris, Handayati, & Osman, 2021](#); [Li, Su, Zhang, & Mao, 2018](#)).

Nevertheless, empirical studies rarely examine the micro-level transition from system features to digital resources and subsequently to activated dynamic capabilities. Most research treats digital capability as an aggregate construct rather than unpacking its internal formation mechanism ([Plekhanov et al., 2023](#)). This study addresses that gap by proposing a refined activation model that links routine embedding → sensing (data use) → managerial commitment (seizing) → organizational adjustment (reconfiguring) → emerging competitive positioning. This integrated mechanism reflects the complementarity of RBV and Dynamic Capability Theory, where RBV provides the foundation of resource existence and embedding, while Dynamic Capability Theory explains the transformation process that activates those resources into competitive outcomes.

Figure 1 clarify the proposed theoretical relationships, it illustrates the sequential activation process through which digital artifacts are transformed into strategic resources and subsequently contribute to the development of emerging competitive positioning. The model integrates the resource qualification perspective from digital resource literature with the capability activation logic of dynamic capability theory.

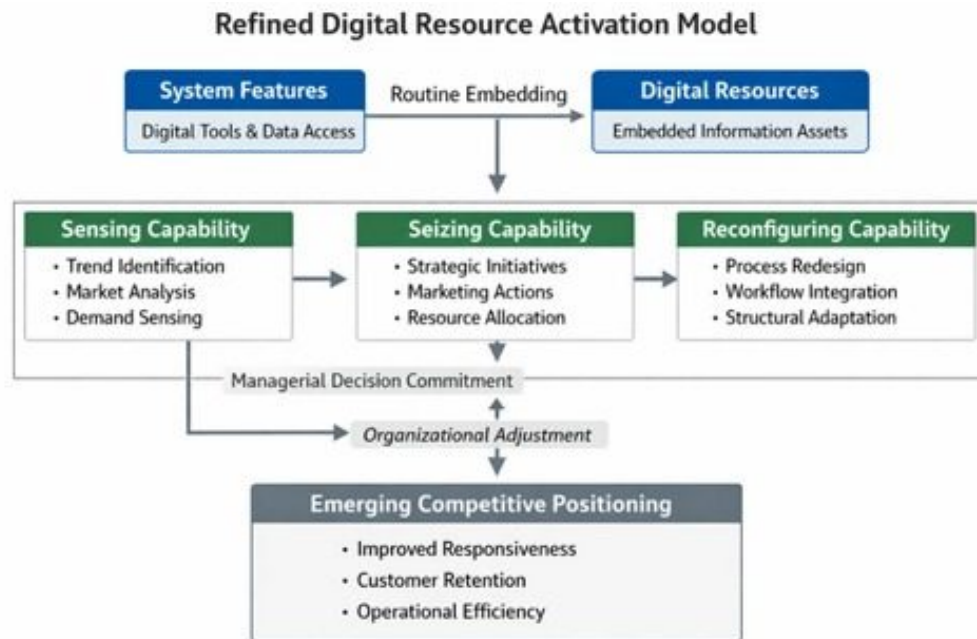


Figure 1. Refined digital resource activation model

3. Methodology

This research employed a qualitative approach with a multiple-case embedded study design. This approach was chosen because the research objective was not to statistically test causal relationships, but rather to explain the processual mechanisms linking system features to competitive position through the activation of resources and capabilities. The multiple-case design allows for logical replication across cases, so findings are not based on a single observation, but rather on consistent patterns across units of analysis, as recommended in comparative case studies ([Saeedikiya, Salunke, & Kowalkiewicz, 2024](#); [Yin, 2018](#)). The use of a multiple-case design also enhances analytical generalization by enabling theory-building from replicated patterns rather than statistical inference, which is particularly suitable for exploring processual mechanisms in digital transformation contexts.

The primary unit of analysis is the MSME organization, while sub-units of analysis include operational routines, managerial decision-making practices, and the use of system features in daily activities. Six MSMEs in the East Bandung region were purposively selected based on the criteria of having been operating for at least two years, previously using manual record-keeping, and then implementing a web-based information system that includes a product catalog, customer database, and automated transaction reporting. These selection criteria were established to ensure theoretical relevance rather than statistical representativeness, specifically to capture firms undergoing comparable stages of digital transition from manual to system-based operations. The requirement of at least two years of operation ensured organizational stability, while prior manual systems allowed observation of clear transformation processes after digital implementation.

Data collection was conducted over six weeks following system implementation. Primary data were obtained through semi-structured interviews with twelve informants: six business owners and six operational staff. Interviews focused on changes in work routines, frequency of data use, decision-making patterns before and after implementation, and the types of organizational adjustments made. In addition to interviews, participant observation and system log analysis were used to quantify the intensity of feature usage ([Li, 2020](#)).

Data analysis was conducted in three stages. The first stage was within-case analysis to identify the process of converting system features into digital resources in each MSME. The second stage was cross-case pattern matching to test the consistency of activation mechanisms across cases. The third stage was analytical generalization, linking the empirical findings to the modern RBV framework and

dynamic capability ([Miguel et al., 2022](#); [Plekhanov et al., 2023](#)). Cross-case pattern matching was specifically used to strengthen internal validity by identifying recurring mechanisms across cases rather than isolated events. Analytical generalization was applied to extend findings toward theory refinement rather than population-level generalization. Internal validity was maintained through member checking and audit trails; reliability was strengthened through the use of a consistent interview protocol. In addition, triangulation across interviews, participant observation, and system log data further enhanced construct validity by ensuring convergence between perceived behavioral changes and actual system usage patterns.

4. Results and Discussions

4.1 Results

The results of the study indicate that information system implementation does not automatically result in strategic change. In the first week of implementation, most MSMEs used the system only as an administrative record-keeping tool. The customer database and transaction reporting features were not yet utilized for strategic analysis ([Kurniawati, Idris, Handayati, & Osman, 2021](#)).

The conversion of system features into digital resources occurred when weekly evaluation routines began to form. Four of the six MSMEs began regularly reviewing sales data. At this stage, system features were no longer viewed as administrative tools but as sources of strategic information. System features are converted into digital resources through routine embedding ([\(Li, Su, Zhang, & Mao, 2018\)](#)). In the observed cases, system use becomes part of formal work procedures ([Jun, Nasir, Yousaf, Khattak, Yasir, Javed, & Shirazi, 2022](#)).

The intensity of data utilization triggers the emergence of sensing capability. Business owners begin to identify trends in best-selling products, customer segmentation, and demand fluctuations. This activity answers the second research question. Sensing does not always develop into strategic action: two MSMEs identified sales patterns but withheld decisions to change due to risk concerns and low reorganization capacity ([\(Miguel, De-Pablos-Heredero, Montes, & García, 2022; Li, 2020\)](#)

Managerial decision commitment is a determining factor in the transition from sensing to seizing. Four MSMEs demonstrated the courage to adjust promotions and inventory management based on data. The other two continued to rely on intuition. Variations are observed in managerial responses related to data-driven decision practices and organizational readiness ([Jun et al., 2022](#); [Kraus, Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022](#)).

Reconfiguring capability emerged when decision changes were followed by adjustments to work structures. In the four MSMEs, new task allocations and system-based reporting formalizations occurred. Organizational adjustments (resource allocation, reporting formalization) occur following decision changes and are associated with strengthened reconfiguring capability ([Plekhanov, Franke, & Netland, 2023](#)).

This mechanism resulted in an emerging competitive positioning in the form of increased customer retention, reduced recording errors, and faster market response. Emerging competitive positioning appears at an early stage and develops gradually across cases, consistent with observed patterns in digital capability and MSME performance ([Kurniawati et al., 2021](#); [Miguel et al., 2022](#)).

Table 1. Cross case activation matrix (scaled 1-5 measurement)

Case	Routine Embedding	Data Utilization Intensity	Sensing Capability	Managerial Decision Commitment	Seizing Capability	Organizational Adjustment	Reconfiguring Capability	Emerging Competitive Positioning
MSME A	5	5	5	5	5	4	5	5
MSME B	3	3	3	3	3	2	3	3
MSME C	4	5	5	4	4	4	4	4
MSME D	1	2	2	1	1	1	1	1
MSME E	3	4	4	3	3	3	3	3
MSME F	2	3	3	2	2	2	2	2

Table 1 provides a scaled cross-case comparison of activation intensity across the six MSMEs. The scoring is derived from triangulated qualitative assessment combining interview narratives, system log frequency, and observational consistency. Routine embedding was scored based on the institutionalization of digital review routines and integration into standard operating procedures. Data utilization intensity reflects frequency and diversity of analytical use. Capability constructs were scored based on observable managerial decisions and documented organizational adjustments.

The matrix reveals a clear activation gradient. MSME A and C exhibit high activation scores across all dimensions, indicating a fully operationalized digital resource activation mechanism. MSME D shows consistently low scores, suggesting stalled transformation at the adoption stage. Intermediate cases demonstrate partial activation, supporting the argument that digital transformation unfolds as a staged and intensity-based process rather than a binary state.

Notably, managerial decision commitment displays strong alignment with seizing and reconfiguring scores, reinforcing its mediating role in the activation mechanism. The pattern supports the theoretical proposition that routine embedding and managerial commitment serve as critical activation thresholds in MSME digital transformation.

The cross-case activation matrix reveals a patterned relational alignment among routine embedding, data utilization intensity, managerial decision commitment, and the activation of dynamic capabilities. Although the study does not employ statistical correlation testing, the intensity scores across cases demonstrate consistent directional associations that support the proposed activation mechanism.

First, routine embedding exhibits a strong narrative association with digital resource qualification. Cases with high routine embedding scores consistently demonstrate high data utilization intensity. This pattern suggests that routine institutionalization functions as an enabling condition for the conversion of system features into operational digital resources. From a Resource-Based View perspective, this supports the argument that resource value is not inherent but constructed through organizational processes ([Barney, 1991](#); [Li, 2020](#)). In other words, embedding routines increases the likelihood that digital artifacts meet VRIN criteria through contextual use rather than ownership alone.

Second, data utilization intensity shows a positive narrative relationship with sensing capability. Across cases, higher frequency and diversity of data use correspond with stronger opportunity recognition and trend identification. This pattern aligns with Dynamic Capability theory, where sensing depends on systematic environmental scanning and information processing ([Teece, 2018](#)). The findings suggest that sensing capability in MSMEs emerges as a behavioral outcome of data engagement rather than as an abstract managerial skill ([Harvey, 2025](#)).

Third, managerial decision commitment appears to function as a mediating mechanism between sensing and seizing capability. In cases where sensing scores are moderate to high but managerial commitment remains low, seizing capability does not fully materialize. This divergence indicates that sensing alone is insufficient for strategic action. Commitment represents the decisive threshold that transforms analytical awareness into implemented strategic change. The observed alignment reinforces the argument that dynamic capabilities are managerial in nature and depend on willingness to commit resources and assume risk ([Breznik, Lahovnik, & Dimovski, 2019](#); [Hodgkinson, & Healey, 2011](#); [Teece, 2022](#)).

Fourth, organizational adjustment demonstrates a reinforcing relationship with reconfiguring capability. Cases that institutionalize workflow modifications and formalize reporting structures display higher reconfiguring scores. Conversely, where organizational adjustment remains informal or partial, reconfiguring remains limited. This pattern suggests that reconfiguration requires structural reinforcement to become sustainable. From a theoretical standpoint, this supports the view that dynamic capability activation requires both managerial agency and structural alignment ([Warner & Wäger, 2019](#)).

Finally, emerging competitive positioning correlates with cumulative activation intensity across all preceding variables. No case exhibits strong competitive positioning without high or moderate scores in routine embedding, managerial commitment, and reconfiguring capability. This cumulative pattern supports the integrative model proposed in this study, in which competitive differentiation emerges from staged activation rather than isolated variable strength.

Taken together, the narrative correlation across variables strengthens the theoretical integration between Resource-Based View and Dynamic Capability. Routine embedding and data utilization explain resource qualification, while managerial commitment and organizational adjustment explain capability activation. Competitive positioning emerges as the outcome of their interaction. This relational alignment provides empirical grounding for the proposed staged digital resource activation model and demonstrates that MSME digital transformation operates as an intensity-based continuum rather than a binary adoption outcome.

Table 2. Routine embedding and capability activation indicators

Construct	Theoretical Anchor	Operational Definition	Observable Indicators	Measurement Basis	Data Source
Routine Embedding	Resource Institutionalization (RBV)	Degree to which digital system usage is embedded into formal organizational routines	Scheduled data review sessions; inclusion of system reports in decision meetings; documented SOP updates; consistent weekly usage patterns	Frequency (per week); formal documentation presence; procedural integration level	Interview, Observation, System Logs
Digital Resource Qualification	VRIN contextualization (RBV)	Extent to which system-generated data are treated as strategic inputs	Use of customer database for segmentation; reliance on transaction analytics for stock planning; archival consistency of digital records	Evidence of data-based decision; diversity of data application; decision traceability	Interview, System Logs
Data Utilization Intensity	Information Processing (Dynamic Capability – Sensing)	Frequency and diversity of analytical system use in managerial activities	Report access frequency; analytic feature utilization; comparative trend analysis; cross-period evaluation	Access frequency count; diversity index of data used; duration of analytic interaction	System Logs, Interview
Sensing Capability	Opportunity Recognition (DC – Sensing)	Ability to identify trends, risks, and opportunities through data analysis	Trend identification statements; early detection of demand shifts; proactive opportunity recognition; scenario discussion in meetings	Qualitative coding of strategic statements; consistency of anticipatory decisions	Interview, Observation
Managerial Decision Commitment	Strategic Intent (DC – Seizing)	Willingness of management to implement data-driven strategic adjustments	Implementation of promotional changes; pricing adjustment decisions; resource reallocation; risk acknowledgment in decisions	Number of implemented changes; documented decision shifts; resource reallocation evidence	Interview, Documentation

Construct	Theoretical Anchor	Operational Definition	Observable Indicators	Measurement Basis	Data Source
Seizing Capability	Strategic Execution (DC – Seizing)	Extent to which identified opportunities are translated into concrete actions	Launch of targeted campaigns; stock realignment; customer-specific marketing; measurable short-term performance adjustments	Presence of implemented initiatives; alignment between data and action	Observation, Documentation
Organizational Adjustment	Structural Alignment (DC – Reconfiguring)	Formal modification of workflows and task allocation to support digital routines	Task redistribution; reporting structure modification; new procedural documentation; accountability assignment	SOP modification evidence; structural task change documentation	Interview, Organizational Records
Reconfiguring Capability	Asset Realignment (DC – Reconfiguring)	Sustainability of new digital-based organizational processes	Replacement of manual process; persistent digital reporting; adaptive workflow stabilization; long-term process continuity	Duration of new routine persistence; reduction of manual fallback	Observation, Follow-up Interview

Table 2 operationalizes the constructs underlying the digital resource activation mechanism. Each construct is anchored in either Resource-Based View or Dynamic Capability theory to ensure theoretical alignment. Observable indicators were derived from triangulated qualitative data, including interview narratives, observational evidence, and system log analytics. Measurement basis combines frequency metrics, documentation presence, and qualitative coding of managerial behavior.

Routine embedding is treated as the institutionalization threshold that enables digital resource qualification. Data utilization intensity activates sensing capability through structured information processing. Managerial decision commitment functions as the transition mechanism linking sensing to seizing. Organizational adjustment reinforces reconfiguring capability by formalizing structural alignment. The table ensures that construct interpretation is grounded in observable evidence rather than abstract categorization.

Table 3. Cross case activation index summary

Case	RBV Sub-Index (RE + DRQ + DUI)	DC Sub-Index (S + MDC + SZ + OA + RC)	Competitive Positioning Score	Overall Activation Index
MSME A	5.0	4.8	5	4.9
MSME B	3.0	2.8	3	2.9
MSME C	4.7	4.2	4	4.4
MSME D	1.3	1.2	1	1.2
MSME E	3.7	3.2	3	3.3
MSME F	2.3	2.2	2	2.2

Table 3 presents a cross-case summary of the activation indices, allowing comparison of resource activation, dynamic capability development, and competitive positioning across the six MSMEs.

Note: Scale 1 = Very Low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very High

The Activation Index is calculated as the average of all the main constructs in the model (Routine Embedding, Digital Resource Qualification, Data Utilization Intensity, Sensing, Managerial Commitment, Seizing, Organizational Adjustment, Reconfiguring, Emerging Positioning).

Abbreviation Description:

RE= Routine Embedding
DRQ= Digital Resource Qualification
DUI= Data Utilization Intensity
S= Sensing
MDC= Managerial Decision Commitment
SZ= Seizing
OA= Organizational Adjustment
RC= Reconfiguring

Table 3 presents the composite activation index across cases, distinguishing between the Resource Qualification (RBV cluster) and Capability Activation (Dynamic Capability cluster). The RBV Sub-Index captures the behavioral construction of digital resources, while the DC Sub-Index reflects staged capability activation intensity.

The results demonstrate a clear gradient pattern. MSME A and C exhibit high RBV and DC sub-indices, resulting in strong overall activation scores and clearer emerging competitive positioning. MSME D displays consistently low scores across all dimensions, indicating stagnation at the adoption stage without effective activation. Intermediate cases reveal partial alignment, supporting the argument that digital transformation unfolds along an activation continuum rather than a binary adoption outcome.

Notably, cases with high RBV sub-index but moderate DC sub-index demonstrate that resource qualification alone is insufficient to generate competitive differentiation. The alignment between RBV and DC clusters appears necessary for higher overall activation scores. This finding strengthens the integrative theoretical argument that resource qualification and capability activation operate sequentially and cumulatively.

The Activation Index is not intended for statistical inference but serves as an analytical generalization tool to enhance cross-case comparability and theoretical clarity. It reinforces the staged activation logic underlying the refined digital resource activation model.

Model Validation Logic. The activation index presented in Table 3 is designed as an analytical generalization tool rather than a statistical instrument. Given the qualitative multiple-case design of this study, the objective is not to establish statistical correlation but to enhance cross-case comparability and theoretical coherence. The index operationalizes construct intensity through triangulated qualitative evidence, integrating interview narratives, observational documentation, and system log frequency patterns.

The validity of the activation index rests on three methodological foundations. First, construct validity is ensured through clear theoretical anchoring. Each variable included in the index is directly derived from Resource-Based View and Dynamic Capability theory. Routine embedding and digital resource qualification represent the resource construction phase, while sensing, seizing, and reconfiguring represent capability activation stages. This theoretical grounding ensures that the index reflects conceptual logic rather than arbitrary scoring.

Second, internal validity is reinforced through pattern consistency across cases. The observed gradient alignment between RBV sub-index and Dynamic Capability sub-index demonstrates sequential activation rather than isolated variable fluctuation. Cases with higher resource qualification

consistently exhibit stronger capability activation, suggesting relational coherence consistent with the proposed staged mechanism.

Third, reliability is supported by explicit scoring rubrics. The 1–5 scale is anchored in observable behavioral criteria rather than subjective perception. Scores are assigned based on documented routine institutionalization, frequency of data access, implemented strategic decisions, and structural workflow adjustments. The use of triangulated evidence reduces single-source bias and enhances interpretive robustness.

It is important to emphasize that the activation index does not transform this qualitative research into a quantitative model. Instead, it strengthens analytical transparency by making cross-case comparisons systematic and theoretically interpretable. The index serves as an intermediate validation layer linking qualitative insights to conceptual propositions.

From a theoretical perspective, the activation index supports the staged logic of the refined digital resource activation model. Resource qualification precedes capability activation, and capability activation precedes emerging competitive positioning. The consistency of this sequential pattern across cases strengthens the explanatory power of the model and enhances its transferability to similar MSME contexts. Thus, the activation index functions as a structured interpretive instrument that enhances rigor while remaining consistent with qualitative case study methodology and analytical generalization principles.

4.2 Discussion

The findings of this study provide a structured explanation of how digital transformation unfolds within MSMEs through a staged activation continuum. The refined digital resource activation model demonstrates that system features do not automatically generate strategic value. Instead, value emerges only after routine embedding enables digital resource qualification. According to ([Barney, 1991](#)), this process confirms that resource value in digital contexts is behaviorally constructed rather than technologically inherent, reinforcing the core premises of Resource-Based View and extending its logic into digital organizational settings ([Hsiao, 2024](#); [Li, 2020](#)).

Routine embedding functions as the institutionalization mechanism that converts system features into qualified digital resources. Without formalized digital routines, system features remain operational tools rather than strategic assets. The cross-case analysis and RBV sub-index scores indicate that higher levels of routine embedding consistently correspond with stronger digital resource qualification. This finding supports the argument that digital resources acquire strategic value only when integrated into organizational processes, consistent with contemporary digital transformation scholarship ([Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, & Haenlein, 2021](#)).

Data utilization intensity activates sensing capability through structured information processing. Cases demonstrating frequent and diversified engagement with system-generated reports show stronger opportunity recognition and trend anticipation ([Kim & Jin, 2024](#)). This observation aligns with Dynamic Capability theory, where sensing depends on systematic environmental scanning and interpretative capacity ([Teece, 2018](#)). Moreover, prior research by [Warner and Wäger \(2019\)](#) indicates that digital capability development mediates the relationship between transformation initiatives and performance outcomes, which is reflected in the activation gradient observed across cases in this study.

However, sensing alone does not guarantee strategic execution. As observed in this study, some MSMEs identified sales patterns but did not proceed to decision-making due to risk concerns and limited reorganization capacity ([Miguel, De-Pablos-Heredero, Montes, & García, 2022](#)). The study identifies managerial decision commitment as the activation threshold linking sensing to seizing. The activation index gradient reveals that cases with moderate sensing but low managerial commitment fail to progress toward effective seizing. This divergence suggests that managerial agency plays a decisive role in capability transition. The finding refines Dynamic Capability theory by specifying the

behavioral mechanism that determines stage progression ([Breznik, Lahovnik, & Dimovski, 2019](#); [Helfat, & Peteraf, 2015](#); [Teece, 2022](#)).

Organizational adjustment further reinforces reconfiguring capability. Structural alignment, task redistribution, and formal workflow modification sustain digital transformation beyond individual initiative. This observation supports arguments that digital transformation success requires both managerial orchestration and structural realignment ([Warner & Wäger, 2019](#)). The dynamic capability sub-index confirms that sustained reconfiguration depends on institutional support rather than isolated managerial decisions ([Ellström, Holtström, Berg, & Josefsson, 2022](#)).

Importantly, the activation index demonstrates cumulative alignment between the RBV cluster and the Dynamic Capability cluster. This finding indicates that competitive positioning develops gradually rather than instantaneously, consistent with studies on digital capability and MSME performance ([Kurniawati, Idris, Handayati, & Osman, 2021](#); [Miguel et al., 2022](#)). High resource qualification without corresponding capability activation results in partial transformation. Conversely, when both clusters align at high intensity, emerging competitive positioning becomes evident. This cumulative pattern strengthens the integrative perspective that competitive differentiation arises from the interaction between resource qualification and capability activation rather than from technology adoption alone.

It is important to clarify that the competitive outcomes observed represent emerging competitive positioning rather than sustained competitive advantage. The temporal scope of the study captures early-stage differentiation such as improved responsiveness and reduced operational errors. Sustained advantage requires continuous reconfiguration over time, consistent with long-range strategic adaptation logic ([Teece, 2018](#); [Wilden, Gudergan, Nielsen, & Lings, 2013](#)).

Overall, the refined digital resource activation model integrates Resource-Based View and Dynamic Capability through a staged behavioral mechanism. Resource qualification precedes capability activation, capability activation precedes emerging competitive positioning, and managerial decision commitment functions as the activation threshold. The activation index strengthens analytical transparency while remaining consistent with qualitative analytical generalization principles ([Yin, 2018](#)).

5. Conclusions

5.1 Conclusion

This study concludes that digital transformation in MSMEs is best understood as a staged activation continuum rather than a technology adoption event. System features acquire strategic relevance only when routine embedding institutionalizes digital usage and enables digital resource qualification. Data utilization intensity activates sensing capability, yet managerial decision commitment functions as the activation threshold that determines whether sensing progresses into seizing and reconfiguring.

The cross-case activation index demonstrates that emerging competitive positioning arises only when resource qualification and capability activation align cumulatively. MSMEs that institutionalize digital routines and exhibit strong managerial commitment display higher activation intensity and clearer early-stage differentiation. Conversely, firms lacking embedding or commitment remain at superficial adoption stages.

The most significant empirical contribution of this study is the identification of a sequential activation mechanism, routine embedding → data utilization → sensing → managerial decision commitment → capability reconfiguration, which empirically demonstrates that competitive positioning emerges only when behavioral institutionalization and managerial agency jointly reach a critical activation threshold across cases.

By integrating Resource-Based View and Dynamic Capability through an empirically grounded staged mechanism, this study contributes a process-based explanation of MSME digital transformation. The

findings clarify why digital investment alone does not guarantee competitive differentiation and highlight the importance of behavioral institutionalization and managerial agency.

The model provides a theoretically coherent and analytically transparent framework that can be tested in future longitudinal or quantitative research. While the present study captures emerging competitive positioning within a limited observation period, it establishes a structured foundation for examining sustained advantage in subsequent investigations.

5.2 Research Limitations

This study has several limitations. First, the number of cases is limited to six MSMEs within a single regional ecosystem, which restricts statistical generalization. However, the objective of the study is analytical generalization grounded in cross-case replication logic. Second, the observation period captures early-stage activation effects and emerging competitive positioning rather than sustained competitive advantage. Longitudinal studies are therefore recommended to examine whether the staged activation mechanism produces durable strategic outcomes over time.

5.3 Suggestions and Directions for Future Research

Future research may test the proposed theoretical propositions quantitatively across larger MSME samples to validate the activation threshold mechanism and the cumulative alignment between resource qualification and capability activation. Comparative cross-regional studies within Indonesia could further explore contextual contingencies influencing routine embedding and managerial commitment. Additionally, mixed-method designs incorporating objective performance metrics may strengthen empirical robustness and refine the activation index construct.

The most significant empirical contribution of this study is the identification of a sequential activation mechanism, routine embedding → data utilization → sensing → managerial decision commitment → capability reconfiguration, which empirically demonstrates that competitive positioning emerges only when behavioral institutionalization and managerial agency jointly reach a critical activation threshold across cases.

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Author Contributions

DHF contributed to the conceptualization, methodology development, supervision, formal analysis, preparation of the original draft, review, and editing of the manuscript. CR contributed to formal analysis, validation, investigation, manuscript review, and editing. RH contributed to data curation, investigation, system analysis, manuscript review, and editing. All authors have read and approved the final version of the manuscript.

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